

1 ~ 150 MHz Low Noise Power Amplifier

RPAS0001A is a low noise, wideband, and high linearity amplifier module with an unconditionally stable design. The amplifier offers 17.4 dB typical gain, 2.70 dB noise figure, +30 dBm P_{1dB} and +48 dBm output IP₃ over the frequency range from 1 MHz to 150 MHz. The unit is housed within a 6-pin leadless SMT package with built-in DC block capacitors.

Photo is not available

It is designed to meet the rugged standards of MIL-STD-202 and MIL-STD-883.

Key Features:

Wide Frequency Range: 1 ~ 150 MHz
 High Gain: 17.4 dB
 Low Noise Figure: 2.7 dB
 High P_{1dB}: 30.5 dBm
 High OIP₃: 48 dBm
 Impedance: 50 Ohm
 DC Supply: 210 mA @ +10V/-1.5V
 Small Size: 0.2"x0.4"x0.1"
 MTBF¹: > 1,000,000 hrs
 Built-In Functions: DC blocks at input and output ports, temperature compensation circuitry

Absolute Maximum Ratings²:

Parameters	Symbol	Value	Units
DC Power Supply Voltage	V _{dd}	12	V
Drain Current	I _{dd}	250	mA
Total Power Dissipation	P _{diss}	3	W
RF Input Power	P _{In,Max}	20	dBm
Channel Temperature	T _{ch}	150	°C
Storage Temperature	T _{STG}	-65 ~ +85	°C
Maximum Operating Temperature	T _{O,MAX}	-40 ~ +85	°C
Thermal Resistance	R _{th,jc}	32	°C/W

Electrical Specifications*: (at +23 °C, V_{dd}=10V, V_g=-1.5V)

Testing Item	Symbol	Test Constraints	Min	Nom	Max	Unit
Gain	S ₂₁	1 ~ 150 MHz	17.2	17.4	17.6	dB
Gain Variation	ΔG	1 ~ 150 MHz		+/- 0.2		dB
Input Return Loss	S ₁₁	1 ~ 150 MHz	10	12		dB
Output Return Loss	S ₂₂	1 ~ 150 MHz	14	15		dB
Reverse Isolation	S ₁₂	1 ~ 150 MHz	25			dB
Noise Figure	NF	1 ~ 150 MHz		2.7		dB
Output Power @ 1dB Gain Comp. Point	P _{1dB}	1 ~ 150 MHz	29	30.5		dBm
Output IP ₃	OIP ₃	2-Tone, Pout 0 dBm each, 1 MHz separation	46	48		dBm
Current Consumption	I _{dd}	V _{dd} = +10 V		210		mA
Power Supply Voltage	V _{dd}		+8 ³	+10	+12	VDC
Negative Supply Voltage	V _g		-3.0	-1.5	-1.0	VDC
Operating Temperature	T _o	Case temperature	-40		+85	°C

¹ MTBF: Mean Time Between Failure, per TR-NWT-000332, ISSUE 3, September, 1990, T-40°C

² Operation of this device above any one of these parameters may cause permanent damage.

³ The lower DC supply voltage reduces the performance.
 Specifications are subject to change without notice.

Frequency Response

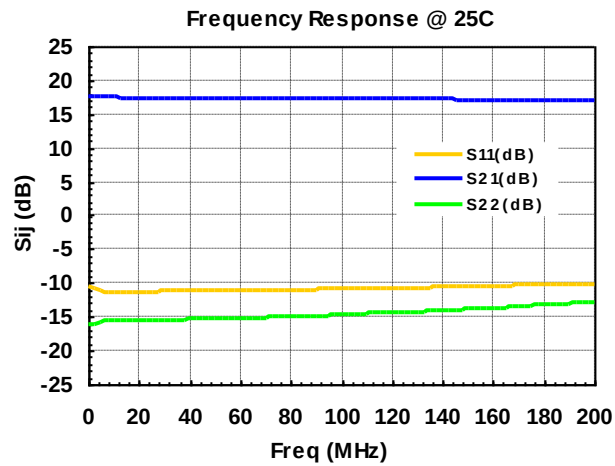


FIG. 1 Small signal performance.

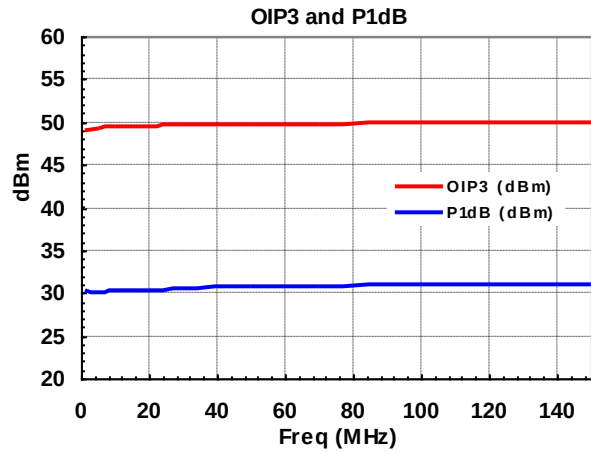


FIG. 2 P_{1dB} and OIP3 at room temperature.

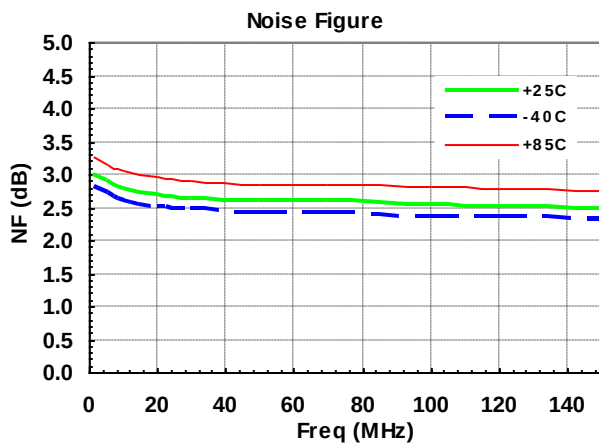


FIG. 3 Noise figure performance at full temperature

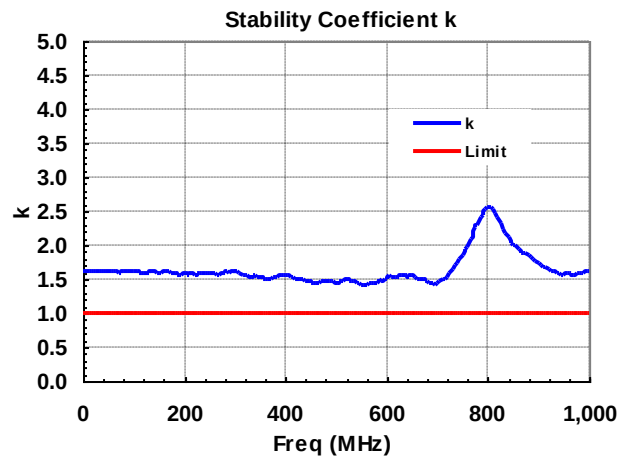


FIG. 4 Stability factor k

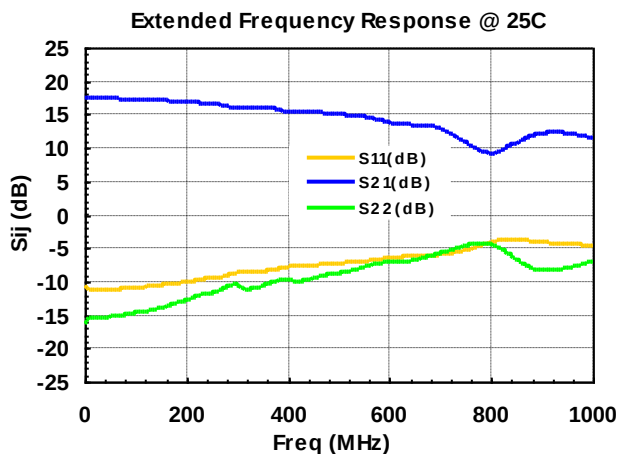
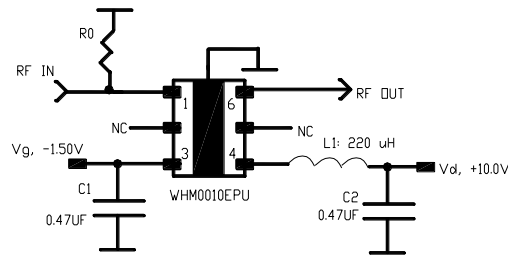


FIG. 5 Frequency response in extended frequency



NOTE:

1. C1 AND C2: CERAMIC SMT, 0805, 16V, X7R.
2. L1: 2 OHM OR LESS DC RESISTANCE IS DESIRED.
3. R0: EMPTY FOR 17.4 dB GAIN, 150 ohm FOR 15.8 dB, AND 75 ohm FOR 14.4 dB.

FIG. 6 Application schematics.

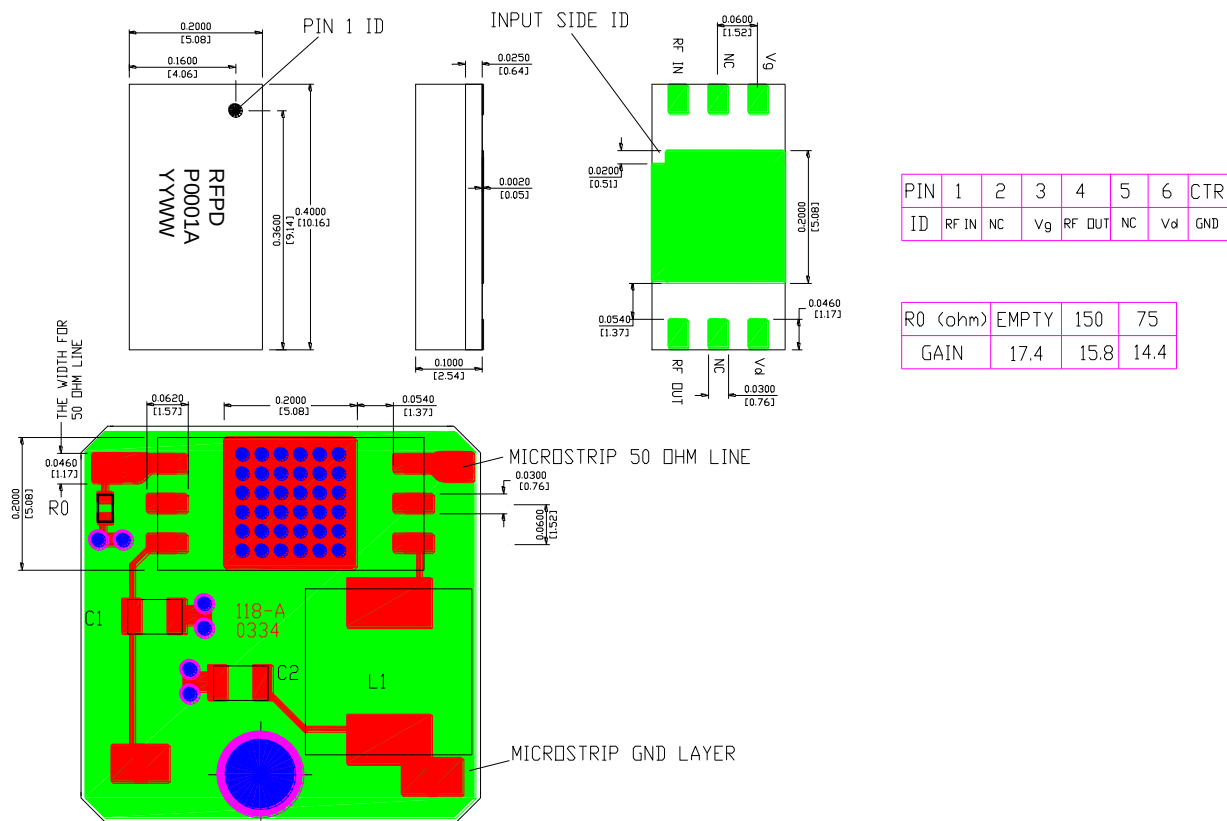


FIG. 7 Outline of package and recommended PCB layout.

Ordering Information

Part Number	RPAS0001A17
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Available exclusively from Richardson RFPD - 800-737-6937 (U.S. & Canada) - 630-208-2700 (International)
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Small Signal S-Parameters:

RPAS0001A, 9/5/03
 Vd = +10.0V, Vg = -1.50 V, Id = 200 mA
 # Mhz s ma r 50

0.1	0.290	-16.0	7.521	-172.0	0.040	15.7	0.150	-174.5
10	0.270	-3.9	7.460	178.2	0.040	0.4	0.170	-178.2
20	0.270	-6.9	7.440	176.2	0.040	-0.8	0.170	-177.3
30	0.280	-10.5	7.430	174.4	0.040	-0.8	0.170	-176.5
40	0.280	-13.9	7.420	172.6	0.040	-1.8	0.170	-175.3
50	0.280	-17.0	7.410	170.8	0.040	-1.7	0.170	-174.5
60	0.280	-20.6	7.390	169.0	0.040	-2.7	0.170	-173.6
70	0.280	-23.9	7.360	167.2	0.041	-2.3	0.170	-172.5
80	0.280	-26.9	7.350	165.3	0.040	-3.3	0.180	-171.7
90	0.280	-30.3	7.320	163.6	0.040	-3.3	0.180	-170.5
100	0.290	-33.8	7.310	161.9	0.040	-2.9	0.180	-169.5
110	0.290	-37.0	7.280	160.1	0.040	-3.9	0.190	-169.5
120	0.290	-40.1	7.260	158.4	0.040	-4.0	0.190	-169.1
130	0.290	-43.3	7.240	156.6	0.040	-4.5	0.190	-169.0
140	0.290	-46.5	7.220	154.8	0.040	-5.4	0.200	-168.6
150	0.300	-49.7	7.190	153.0	0.041	-6.2	0.200	-168.2
160	0.300	-52.6	7.150	151.2	0.040	-5.9	0.210	-167.3
170	0.300	-55.9	7.110	149.4	0.040	-6.3	0.210	-167.2
180	0.310	-58.5	7.070	147.7	0.041	-6.8	0.220	-167.2
190	0.310	-61.4	7.030	146.0	0.041	-7.6	0.220	-166.5
200	0.310	-63.8	6.981	144.2	0.041	-8.9	0.230	-166.5
210	0.320	-66.4	6.940	142.5	0.041	-8.2	0.240	-166.5
220	0.320	-68.9	6.890	140.7	0.041	-8.3	0.240	-166.8
230	0.330	-71.4	6.821	139.0	0.040	-8.9	0.250	-167.4
240	0.330	-74.2	6.750	137.6	0.040	-9.4	0.260	-168.8
250	0.340	-77.1	6.720	136.0	0.040	-10.2	0.260	-169.5
260	0.340	-79.4	6.680	134.0	0.040	-10.9	0.260	-169.6
270	0.340	-81.6	6.611	132.1	0.041	-11.0	0.280	-169.9
280	0.350	-83.9	6.491	130.3	0.040	-11.8	0.290	-171.4
290	0.360	-86.1	6.331	129.1	0.040	-12.1	0.300	-174.2
300	0.370	-89.1	6.250	128.8	0.040	-11.4	0.300	-177.4
310	0.380	-92.7	6.289	128.3	0.040	-11.4	0.280	-179.1
320	0.380	-95.7	6.359	126.9	0.041	-12.2	0.280	-177.8
330	0.380	-98.2	6.380	124.9	0.041	-11.7	0.280	-176.4
340	0.380	-100.2	6.370	122.9	0.040	-12.3	0.290	-175.9
350	0.380	-102.4	6.320	121.0	0.041	-12.8	0.290	-175.7
360	0.380	-104.1	6.261	119.1	0.042	-13.5	0.300	-175.8
370	0.390	-105.8	6.191	117.2	0.041	-14.8	0.310	-176.8
380	0.390	-107.6	6.081	115.6	0.041	-14.8	0.320	-178.5
390	0.400	-109.5	5.961	114.3	0.041	-15.8	0.330	179.1
400	0.410	-112.0	5.880	113.8	0.041	-15.2	0.330	176.6
410	0.420	-114.9	5.890	112.9	0.041	-14.7	0.320	175.5
420	0.420	-117.3	5.930	111.5	0.042	-15.0	0.320	176.0
430	0.420	-119.3	5.930	109.7	0.042	-16.3	0.320	176.7
440	0.420	-121.3	5.900	107.8	0.042	-17.2	0.330	176.9
450	0.420	-123.0	5.860	105.9	0.043	-19.6	0.340	176.6
460	0.430	-124.7	5.810	104.1	0.043	-19.3	0.350	176.1
470	0.430	-126.4	5.740	102.5	0.042	-20.6	0.350	175.2
480	0.430	-128.2	5.670	101.0	0.043	-20.6	0.360	174.3
490	0.440	-130.1	5.610	99.6	0.043	-20.7	0.360	173.5
500	0.440	-132.0	5.570	98.1	0.043	-22.2	0.370	173.0

Richardson RFPD, Inc.

40W267 Keslinger Road

P.O. Box 307

LaFox, IL 60147

Telephone: (800) 737-6937

(630) 208-2700

Fax: (630) 208-2662

Internet: www.richardsonrfpd.com**IMPORTANT NOTICE**

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